## **CLAIMS**

## What is claimed:

1	1.	A phase change material having a selectable phase change temperature in a range	
2	between appro	eximately zero degrees Celsius and four degrees Celsius comprising:	
3	a mixt	ure of water and deuterium oxide wherein the mole fraction of deuterium oxide is	
4	selected to provide a desired phase change temperature.		
1	2. mixture.	The phase change material of claim 1 wherein a nucleating agent is added to the	
1	3.	The phase change material of claim 1 wherein a colorant is added to the mixture.	
1	4. mixture.	The phase change material of claim 1 wherein a gel material is added to the	
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1	5.	The phase change material of claim 1 wherein a temperature depression material	
2	is added to the	e mixture.	

1	6. A method for using the phase change material of claim 1 for storing a temperature		
2	sensitive material in an environment requiring temperatures between approximately zero degrees		
3	Celsius and four degrees Celsius comprising:		
4	providing a container for holding the sensitive material; and		
5	placing the phase change material, when in a solid phase, in close proximity to the		
6	sensitive material such that the temperature of the sensitive material is maintained near the		
7	temperature of the phase change material.		
1	7. A method of keeping a temperature sensitive material at a desired temperature		
2	between approximately zero degrees Celsius and four degrees Celsius comprising the steps of:		
3	mixing water and deuterium oxide, wherein the mole fraction of deuterium oxide is selected		
4	so the mixture has a desired phase change temperature; and		
5	placing the mixture close to the sensitive material so that the temperature of the sensitive		
6	material is maintained at the desired temperature.		
i	8. The method of claim 7 wherein the sensitive material and mixture are thermally		
2	isolated from the environment.		
1	9. The method of claim 7 wherein the sensitive material is a biomaterial.		

1	10.	A treatment pack having a phase change temperature between approximately zero	
2	degrees Celsius and four degrees Celsius comprising:		
3	a pack for holding phase change material; and		
4	a mixture of water and deuterium oxide having a selected mole fraction of deuterium		
5	oxide for a desired temperature wherein the mixture is placed within the pack.		
1	11.	The treatment pack of claim 10 wherein the pack is shaped to conform for a	
2	desired treatment.		
1	12.	The treatment pack of claim 10 wherein a colorant is added to the mixture.	
1	13.	The treatment pack of claim 10 wherein a gel is added to the mixture.	
1	14.	A material that changes phase at a desired temperatures between approximately	
2	zero degrees Celsius and four degrees Celsius comprising:		
3	water; and		
4	deuterium oxide wherein a mole fraction of deuterium oxide is chosen so that the phase		
5	change temperature of the material is the desired temperature.		
1	15.	The material of claim 14 wherein the mole fraction is chosen according to the	
2	approximate	equation, desired temperature = 3.8 * mole fraction of deuterium oxide.	

1	16. The material of claim 14 wherein the material, when in a solid phase, is crushed		
2	and serves as a slurry for surrounding a temperature sensitive material.		
1	17. The material of claim 14 wherein the material is used in a treatment pack.		
1	18. A mixture comprising:		
2	water;		
3	deuterium oxide;		
4	a nucleating agent;		
5	a colorant; and		
6	a gel, wherein the deuterium oxide and the water mole fractions are chosen to provide a		
7	phase change temperature greater than approximately zero degrees Celsius and less than		
8	approximately four degrees Celsius.		
1	19. The mixture of claim 18 wherein the mixture is used to protect temperature		
2	sensitive materials from temperatures below the phase change temperature.		
1	20. The mixture of claim 18 wherein the mixture is used to protect temperature		
2	sensitive materials from temperatures above the phase change temperature.		

- 1 21. A method for providing a phase change material having a freeze temperature close 2 to a desired temperature, comprising the steps of:
- 3 providing water;
- selecting an amount of deuterium oxide to be mixed with the water such that a mixture
- 5 composed of the selected amount of deuterium oxide and the water has a phase change
- 6 temperature close to the desired temperature; and
- 7 mixing the water and the selected amount of deuterium oxide thereby forming the phase
- 8 change material.

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